WHAT IS CLAIMED IS:

SUB B1

1. A biometric sensing apparatus, comprising:

a piezoelectric ceramic sensor; and

a processor, coupled to said sensor, that receives an input from said sensor and produces an output.

2. The apparatus of claim 1, wherein said output is data representing a fingerprint pattern.

3. The apparatus of claim 1, wherein said output is data representing a portion of a finger ridge.

4. The apparatus of claim 1, wherein said output is data representing an arteriole-veinal map.

5. The apparatus of claim 1, wherein said output is data representing a bone map.

6. The apparatus of claim 1, wherein said output is data representing blood flow.

7. The apparatus of claim 1, wherein said output is data representing arteriole blood flow.

8. The apparatus of claim 1, wherein said output is data representing capillary blood flow.

9. The apparatus of claim 1, wherein said output is data representing a ratio of arteriole and capillary blood flow.

10. The apparatus of claim 1, wherein said sensor comprises an array of piezoelectric ceramic elements.

11. The apparatus of claim 10, wherein said array comprises at least 100,000 elements.

12. The apparatus of claim 10, wherein said elements are spaced on a nominal pitch of 50 micrometers.

13. The apparatus of claim 10, wherein said array is large enough to obtain data representing a fingerprint pattern.

14. The apparatus of claim 10, wherein said array comprises a sonic barrier between each of said elements.

15. The apparatus of claim 14, wherein said sonic barrier is air.

16. The apparatus of claim 14, wherein said sonic barrier is an epoxy containing micro-spheres.

17. The apparatus of claim 16, wherein said micro-spheres are vinyl.

18. The apparatus of claim 1, wherein said sensor and said processor are packaged together as an integrated circuit.

19. The apparatus of claim 1, further comprising:

a medium that conducts sonic energy, said medium being coupled to said sensor so that a low sonic energy barrier is formed between said medium and said sensor.

20. The apparatus of claim 19, wherein said medium has an impedance that facilitates conducting sonic energy into tissue.

21. The apparatus of claim 19, wherein said medium is a polymer.

22. The apparatus of claim 21, wherein said medium is urethane.

23. The apparatus of claim 1, further comprising:
a multiplexer that couples said sensor to said processor.

24. The apparatus of claim 1, further comprising:
a backing material, coupled to said sensor, that acts as a sonic energy barrier.

25. The apparatus of claim 24, wherein said backing material is TEFLON foam.

26. The apparatus of claim 24, wherein said backing material is aluminum oxide.

27. A method for obtaining biometric data, comprising the steps of:
(1) placing a biological object proximate to a piezoelectric ceramic sensor array; and
(2) obtaining an output from the sensor array.

28. The method of claim 27, wherein step (1) comprises the step of:
placing a portion of a finger proximate to the array so that a discernable voltage difference is developed between elements of the array loaded by a ridge of the finger and elements of the array loaded by a cavity between two ridges of the finger.

29. The method of claim 27, wherein step (1) comprises the step of:

placing a portion of a finger proximate to the array so that a discernable impedance difference is developed between elements of the array loaded by a ridge of the finger and elements of the array loaded by a cavity between two ridges of the finger.

30. The method of claim 27, wherein step (1) comprises the step of:

placing a portion of a finger proximate to the array so that a discernable signal attenuation difference is developed between elements of the array loaded by a ridge of the finger and elements of the array loaded by a cavity between two ridges of the finger.

31. The method of claim 27, wherein step (1) comprises the step of:

placing a portion of a finger proximate to the array so that a discernable signal adsorption difference is developed between elements of the array loaded by a ridge of the finger and elements of the array loaded by a cavity between two ridges of the finger.

32. The method of claim 27, further comprising the steps of:

placing a portion of a finger proximate to the array; and

obtaining output data that represents a fingerprint pattern.

33. The method of claim 27, further comprising the steps of:

placing a portion of a finger in proximate to the array; and

obtaining output data that represents a portion of a finger ridge.

34. The method of claim 27, further comprising the steps of:

placing a portion of a finger in an acoustic field of the array; and

obtaining output data that represents an arteriole-veinal map.

35. The method of claim 27, further comprising the steps of: placing a portion of a finger in an acoustic field of the array; and obtaining output data that represents a bone map.

36. The method of claim 27, further comprising the steps of: placing a portion of a finger in an acoustic field of the array; and obtaining output data that represents blood flow.

37. The method of claim 27, further comprising the steps of: placing a portion of a finger in an acoustic field of the array; and obtaining output data that represents arteriole blood flow.

38. The method of claim 27, further comprising the steps of: placing a portion of a finger in an acoustic field of the array; and obtaining output data that represents capillary blood flow.

39. The method of claim 27, further comprising the steps of: placing a portion of a finger in an acoustic field of the array; and obtaining output data that represents a ratio of arteriole and capillary blood flow.

40. The method of claim 27, wherein step (2) comprises the step of: comparing voltage differences between elements of the array to obtain the output.

41. The method of claim 27, further comprising the step of: penetrating the outer surface of the biological object with a sonic energy beam to obtain an output representing an internal feature of the object.

42. The method of claim 41, wherein step (2) comprises the step of: determining transit times of echos.

43. The method of claim 41, wherein step (2) comprises the step of: determining amplitudes of echos.

44. The method of claim 41, wherein step (2) comprises the step of: determining phases of echos.

45. The method of claim 27, further comprising the step of: generating a sonic energy beam using the elements of the array; and performing a two-dimensional scan of the biological object.

46. The method of claim 27, further comprising the step of: penetrating the epidermis of a finger with the sonic energy beam to obtain an output representing moving blood erythrocytes.

47. The method of claim 27, further comprising the steps of: placing a portion of a finger in an acoustic field of the array; and measuring a Doppler shift of the acoustic field as an indicate of the well being of the host of the finger.

48. A piezoelectric ceramic fingerprint scanner, comprising:

a piezoelectric ceramic sensor array; wherein said piezoelectric ceramic sensor array includes a layer of ceramic in between first and second conductor grids such that pixels are formed at locations where the first and second conductor grids intersect; and

wherein when an electric pulse is applied in one cycle to at least one pixel through said first and second conductor grids, an output signal representative of a ring-down oscillation over a number of cycles due to the

presence of a fingerprint ridge at said at least one pixel is output from said second conductor grid.

49. A multiplexer for a biometric sensor array, comprising:

a plurality of parallel first conductors, each of said first conductors being coupled to a first end of the array;

a plurality of parallel second conductors orthogonal to said first conductors, each of said second conductors being coupled to a second end of the array; and

a plurality of switches used to control the array, each switch being coupled to one of said first and second conductors.

50. The multiplexer of claim 49, wherein at least one of the switches is a three-way switch.

51. The multiplexer of claim 49, further comprising:

a first shift register coupled to at least some of said switches coupled to said first conductors, said first shift register for controlling the position of said switches.

52. The multiplexer of claim 49, further comprising:

a second shift register coupled to at least some of said switches coupled to said second conductors, said second shift register for controlling the position of said switches.

53. The multiplexer of claim 49, further comprising:

a controller coupled to said switches for controlling the position of said switches.

SUB B2

54. A biometric sensing apparatus, comprising:

a piezoelectric film sensor; and

a processor, coupled to said sensor, that receives an input from said sensor and produces an output.

55. An apparatus, comprising:

a switch for coupling a source of power to a device that utilizes a piezoelectric effect to generate a voltage and wake up the device when the device is electrically turned off.

56. The apparatus of claim 55, wherein said switch comprises:

a piezoelectric sensor;

a diode coupled to said sensor;

a capacitor coupled to said diode, and

a semiconductor device, coupled to said capacitor, that can be turned on using the generated voltage.

57. An apparatus, comprising:

a switch that utilizes a piezoelectric effect to generate a voltage proportional to a force applied to said switch, wherein the voltage can be used to make a selection on an interconnected viewing device.

58. The apparatus of claim 57, wherein said switch comprises:

a piezoelectric sensor;

a diode coupled to said sensor;

a capacitor coupled to said diode, and

an analog-to-digital converter, coupled to said capacitor, that converts the voltage across said capacitor to a digital signal that can be used to make the selection.

59. An apparatus, comprising:

a piezoelectric pointing device wherein a centroid of a finger in contact with said device is used to point on an interconnected viewing device.

60. A system comprising:

a public service layer for use with a wireless communication stack.

61. A method comprising:

coupling a public service layer to a BLUETOOTH protocol stack.

62. A system comprising:

a constellation of BLUETOOTH compliant devices having a public service layer.

add B3